10/8/04
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Work Element Report

Protected Flow

I. Background

A. Description of Protected Flow Concept

The concept of a Protected Flow, as used in Chapter 61 – Water Quality Standards, is considered for stream reaches where a designated use would not occur at the default design low stream regime but the use would occur at a slightly higher flow regime. Thus, the Protected Flow is used in concert with the designation of a use to assure sufficient flow/habitat for a viable aquatic population. This protected flow concept has resulted in many stream reaches with very low or zero flow regimes becoming designated for aquatic life use protection. Without the protected flow concept, the stream reach would not have been recommended for aquatic life use designation.

Historically, default critical low stream regime specified in the Standards has been the seven-day, ten-year low flow ($7Q_{10}$). However, since 2000, the default critical low stream regime associated with the Ammonia criteria was modified to apply the thirty-day, ten-year low flow ($30Q_{10}$) with the Chronic criterion and the one-day ten-year low flow ($1Q_{10}$) with the Acute criterion. For Toxic parameters, the default critical low stream regime was modified to apply the seven-day, ten-year low flow ($7Q_{10}$) with the Chronic criterion and the one-day ten-year low flow ($1Q_{10}$) with the Acute criterion. The Protected Flow value is used in place of any of the acute or chronic associated critical low flows noted above as long as the Protected Flows are larger.

B. Program Uses of the Protected Flow.

The current application of the Protected Flow is associated with the calculation of Wasteload Allocations and water quality-based effluent permit limits for point source dischargers. As with any wasteload allocation calculation, some amount or percentage of the design low stream regime (albeit the 30Q10, 7Q10, etc., or the Protected Flow) is generally allowed to be mixed with the treated wastewater discharge. It is following the allowed mixing considerations in which the Wasteload Allocations would assure that the Acute and Chronic criteria are met in the designated reach of the stream (Class B(LR) or Class B(WW) reach) at all stream flow equal to or greater than the 30Q10, 7Q10, etc., or the Protected Flow.

It is estimated that 75 to 100 continuously discharging wastewater treatment facilities discharge directly or indirectly into reaches with established Protected Flows. The size or discharge flow from these facilities range from multi-million gallons per day to only several thousand gallons per day. The affect of the protected flow concept on each facility's wasteload allocation varies with the facility's design flow, allowed percentage of stream flow mixing with the effluent, and the established Protected Flow value.

II. Protected Flow Changes

In summary, an October 5, 1999, letter from EPA indicated that 'exceptions from the use of the 7Q10 (sic 30Q10 and/or 1Q10) flow to implement water quality criteria must be demonstrated to adequately protect the designated aquatic life use. Departures from these stream design flows are acceptable if shown to provide the same level of protection for designated uses. Iowa has not shown that the protected flow adequately protects aquatic life uses. This issue was the target of EPA disapproval in a neighboring state's revised WQS'.

While the EPA correspondence did not detail the type or nature of the needed documentation, it is evident that the concept of a Protected Flow is inconsistent with their basic guidelines and possibly the Clean Water Act. The suggestion implied from the correspondence is that Protected Flows should be eliminated from the WQS.

In addition to comments from the EPA, several environmental groups have historically submitted objections of the protected flow concept and recently, the department and EPA have come under fire for not appropriately addressing this issue, among a host of others, in a timely fashion.

In response, the department has committed to several time lines to revise the WQS to be consistent the goals and intentions of the CWA. The department and EPA are now working together to develop WQS modifications that will be reasonable and practical while being consistent with goals and intentions of the CWA i.e. EPA approvable. Specifically, the department has committed to proposing rule modification that would eliminate the protected flow concept by December of 2005.

While elimination of the protected flow concept may be a very simple concept to achieve in a rule change, it is with potentially far reaching implications to both the applicability of the stream's use designation and

for Iowa's many wastewater treatment facilities discharging into designated reaches with Protected Flows. Based on the stream use assessment approach following by the Department since 1990, many small stream reaches, particularly the upper extent of small streams, were designated typically Class B(LR) Limited Resource wastewater aquatic life with the assumption that the Protected Flow provided the needed flow to sustained the aquatic life use during severe low flow regimes. The natural 7Q10 stream flow in these reaches was estimated to be equal to or approaching zero cfs. Thus, it is staff opinion that many of the upper reaches of streams with Protected Flow would not have been recommended for designation if this concept were unavailable.

However, with the use designation changes that are occurring simultaneously with the elimination of the protected flow concept, the baseline assumption that without protected flows the stream reach would not have been recommended for aquatic life use designation will no longer apply. It is understood with the proposed use designation changes that a designated stream may exist when the 1Q10, 7Q10, & 30Q10 are zero. The manner in which streams will be designated will be detailed in the warm water use designation assessment protocol that is scheduled to be completed by April of 2006.

Chapter 61 Language Changes:

> ***61.2(5)*** *Implementation strategy. Numerical criteria specified in these water quality standards shall be met when the flow of the receiving stream equals or exceeds the design low flows noted below.*
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> *(table)*
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> ~~*Exceptions may be made for intermittent or low flow streams classified as significant resource warm waters or limited resource warm waters. For these waters, the department may waive the design low flow requirement and establish a minimum flow in lieu thereof. Such waiver shall be granted only when it has been determined that the aquatic resources of the receiving waters are of no significance at flows less than the established minimum, and that the continued maintenance of the beneficial uses of the receiving waters will be ensured. In no event will toxic conditions be allowed to occur in the receiving waters outside of mixing zones established pursuant to subrule 61.2(4). The policy for granting waivers is described in the "Supporting Document for Iowa Water Quality Management Plans," Chapter IV, July 1976, as revised on June 16, 2004. (Copies are available upon request to the Department of Natural Resources, Henry A. Wallace Building, 900 East Grand, Des Moines, Iowa 50319-0034. Copy also on file with the Iowa Administrative Rules Coordinator.)*~~
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> ~~*All minimum flows established under the provisions of this rule will be published by the department. The minimum flows, commonly termed protected flows, are presented in "Iowa Water Quality Standards: Protected Flows For Selected Stream*~~

~~*Segments," dated May 19, 2004. A copy of this document is available upon request from the department. A copy is also on file with the Iowa Administrative Rules Coordinator.*~~

III. Potentially Impacted Dischargers

At this time, the Work Element Report is intended to provide a very brief description of the potentially impacted dischargers. A more in depth discussion will occur as part of the Economic Analysis report for this proposed rule change. It is noted that the work element report will be periodically updated as more detailed information regarding fiscal and/or any other impact related to this rulemaking is established.

In summary, the impact will be associated with the elimination of the dilutional capacity that is associated with the Protected Flow. Less dilutional capacity, or none at all, will be available in the WLA calculations. For many of the impacted facilities, particularly with aerated lagoon treatment systems, it is anticipated that they will not be able to comply with the more stringent ammonia limitations. Thus, the facilities may face construction of a new advanced treatment (ammonia removal) process to assure compliance.